Induction of apoptosis and role of paclitaxel-loaded hyaluronic acid-crosslinked nanoparticles in the regulation of AKT and RhoA

ABSTRACT

Cancer is a complex multifactorial disease and leading causes of death worldwide. Despite the development of many anticancer drugs, there is a reduced survival rate due to severe side effects. The nontargeted approach of convention drugs is one of the leading players in context to toxicity. Hyaluronan is a versatile bio-polymer and ligand of the receptor (CD44) on cancer cells. The MCF-7 and HT-29 cancer cell lines treated with hyaluronic acid-paclitaxel (HA-PTX) showed the distinguishing morphological features of apoptosis. Flow cytometric analysis showed that HA-PTX induces apoptosis as a significant mode of cell death. The activation level of tumor suppressor protein (p53) increased after PTX treatment in MCF-7, but no changes observed in HT-29 might be due to hereditary mutations. The lack of suppression in AKT and Rho A protein suggest the use of possible inhibitors in future studies which might could play a role in increasing the sensitivity of drug towards mutated cells line and reducing the possibilities for cancer cell survival, migration, and metastasis.

Keyword: AKT; Apoptosis; Drug delivery; Flow cytometry; Hyaluronan; Paclitaxel; Rho A